



United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Field Borders and Farmland Songbirds

WATERSHED SCIENCE INSTITUTE

Watershed Technology Works: Wildlife Stewardship

For information on the contents of this publication, contact Hank Henry, Terrestrial Ecologist, Watershed Science Institute, at (919) 515-4181.

Acknowledgment

Information in this publication was adapted from the masters thesis of Jeffrey F. Marcus, working under the direction of Dr. Peter T. Bromley, Dept. of Zoology, North Carolina State University, Raleigh, NC 27695-7646.

Photos were provided by Jeffrey F. Marcus, Dept. of Zoology, North Carolina State University.

USDA Nondiscrimination Statement

"The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternate means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer."



Figure 1. Many species of farmland songbirds, including this Savannah sparrow, use field borders for wintering or nesting habitat.

Introduction

The past century has witnessed dramatic changes in farming landscapes. With increases in field sizes and improvements in machinery and herbicides, traditional edge habitats of brush, forbs, and nonplanted vegetation have been significantly reduced. This habitat is important for many wild birds found on farmlands to breed, forage, loaf, and escape predators (fig. 1). Concurrent with the loss of habitat has been a decline in populations of some farmland songbirds such as field sparrows. Nest predators may also be playing a role in reducing bird populations. As suitable nesting habitat is reduced, it may be easier for mid-sized mammalian predators, such as raccoons, foxes, and opossums, to find and destroy bird nests.

Background

Dr. Peter Bromley at North Carolina State University (NCSU) helped establish the Farm Wildlife Recovery Team to explore ways of increasing wildlife populations on farms, while maintaining farm profitability. Typically, crops are planted to the

field edge, and ditchbank vegetation is mowed annually on grain farms in North Carolina. To assess the potential benefits of field borders for wildlife, the Recovery Team is testing the efficacy of returning some “weedy edge” habitat to the farm in the form of fallow field borders (fig. 2). NCSU researchers have been evaluating whether 10- to 15-foot-wide fallow field borders, consisting of nonplanted vegetation, would improve water quality, increase populations of bobwhite quail and songbirds, and affect crop pest management.



Figure 2. A fallow ditch side field border managed for grassland habitat runs through the middle of this North Carolina wheat field.

Concern over the role that mammalian predators play in bird nesting success led to the addition of a predation study supported jointly by the North Carolina Wildlife Resources Commission and Virginia Department of Game and Inland Fisheries.

The intensive songbird portion of the study ran from the spring of 1996 through the summer of 1998. It was conducted in the upper coastal plain (Wilson County) and lower coastal plain (Hyde and Tyrrell Counties) of North Carolina to test the effectiveness of the treatments across different farming landscapes (fig. 3). Songbirds were also

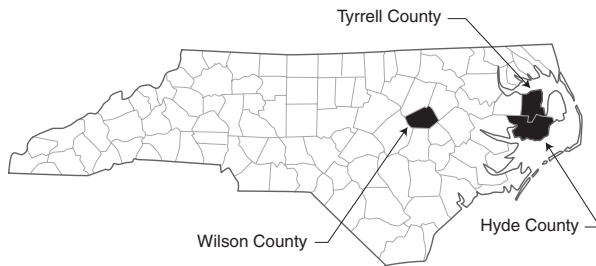


Figure 3. Location of study sites in the North Carolina coastal plain.

monitored on four farms in Amelia County, Virginia; however, the data from this work is not presented here.

The Wilson County farms consisted of small (<8 acres) fields interspersed with timber stands and house sites. The farms selected in Hyde and Tyrrell Counties were large commercial farms consisting of intensively managed, uniformly shaped fields (approximately 18 acres each), with no intervening timber stands or house sites. In each county, 4 farms of 300 to 500 acres each were selected. Fallow field borders of 10 to 15 foot widths were established on 2 farms per county, and 2 farms per county were kept without field borders, crops were planted to the field edge, and all fallow vegetation was mowed in the winter. To test if predator removal would reduce nest predation pressure and result in an increase in quail numbers, raccoons, foxes, and opossums were removed from 2 farms per county (one with and one without field borders) from January to June (fig. 4). Animals were captured in live traps, allowing for the release of nontarget animals and the return of pets to owners or animal shelters. Raccoons, foxes, and opossums were delivered to the NC State Veterinary School and used in disease, toxicology, anatomy, and other studies.

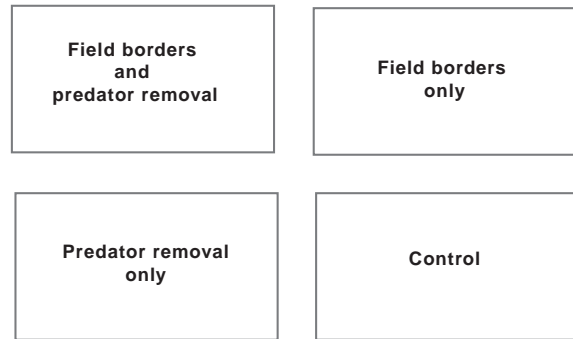


Figure 4. Experimental design setup for four farms within each county.

Results

Songbird response was measured at two critical times of the year, late winter (February) and breeding season (mid-April to early August). During February, birds were surveyed in fields and field edges using line and strip transect techniques. These surveys revealed that field edges harbored mostly northern cardinals, dark-eyed juncos, and song, savannah, swamp, white-throated, field, and chipping sparrows in the late winter. Fields with

fallow borders surrounding them contained a greater density of sparrows in both the field edge and field interior, indicating that field borders provide important late winter habitat.

From mid-April to early August (breeding season), bird abundance and diversity were surveyed using point counts. Before the survey, a list of indicator birds was compiled from those birds that were anticipated to benefit either directly or indirectly from field borders (table 1). The cowbird is included because of its potential to reduce the reproductive success of other birds through nest parasitism (laying eggs in another bird's nest to the detriment of the host bird). Farms with field borders tended to have greater numbers of these indicator species than farms without field borders. Bobwhite quail, field sparrows, and common yellowthroats were detected in greater numbers on farms with field borders while indigo buntings were more abundant on farms with no field borders.

Table 1. Indicator species*

Indigo bunting	Common yellowthroat
Blue grosbeak	Eastern bluebird
Chipping sparrow	Eastern meadowlark
Field sparrow	Brown-headed cowbird
Northern bobwhite quail	

* These birds exhibit several different feeding and nesting strategies and are representative of Eastern farmland birds. Some populations are increasing while others are declining.

Reproductive success was measured by locating and monitoring nests in Wilson and Hyde Counties. Fallow areas provided critical nesting habitat; very few elevated cup nests were found in row crops. The primary nesting species were field sparrow, common yellowthroat, indigo bunting, blue grosbeak, northern mockingbird and yellow-breasted chat. Field borders contained a greater abundance and species diversity of nests than the corresponding mowed edges, particularly early in the breeding season when little cover was available elsewhere (fig. 5). Field sparrows and common yellowthroats showed the greatest nesting preference for field borders.



Figure 5. A field border has provided the ideal site for this red-winged blackbird nest.

Offsetting the increased nest density was low reproductive success. Overall nest success was less than 17 percent. The primary cause (88%) of nest failure was predation. It could not be determined which predators were responsible. Nest success on farms where 100 mammalian predators (foxes, raccoons, opossums, and feral cats and dogs) were removed between January and June did not differ from farms without predator removal. The lack of response to predator removal may have been a result of increased depredation by other nest predators, such as black rat snakes. More study is needed to fully understand the effectiveness and ecological consequences of predator removal. Brown-headed cowbird parasitism was not a significant source of nest failure; only 3 of 53 active nests were parasitized and no nest failed because of parasitism.

Nesting success was only 6 percent for field sparrows. The combination of increased breeding density with low nest success suggests that field borders may be acting as ecological traps (a place that attracts breeding birds only to have them suffer high mortality or low reproduction) for field sparrows. However, if these birds are limited by suitable nesting habitat, then reproductive success in field borders, no matter how low, will be a plus for the population.



Figure 6. One of the study site field borders that separates a crop field from a wood lot.



Figure 7. Landscapes made up of a diverse mosaic of habitats including wood lots, field borders, and crop fields broken up by corridors increases usable habitat for songbirds and many other wildlife species.

The effects of field borders differed between farming landscapes. Field borders had a greater positive effect on bird counts in both summer and winter in Wilson County than Hyde County. Additionally, only 5 nests were found in Hyde County compared to over 150 in Wilson County. Vegetation surveys indicated that field borders in Wilson County contained greater amounts of potential food and nesting substrates, such as blackberry, cane, and greenbriar, than Hyde County borders. There were also dramatic differences in landscape composition. Fields in Hyde County were typically located next to other large fields and did not have other suitable bird habitats, such as timber stands, ponds, fence rows, windbreaks, house sites, and fallow areas, in close proximity. Fields in Wilson County were smaller and had many of these different habitats nearby, allowing birds greater access to and use of field borders.

Management implications

- Field borders have the potential to increase wintering densities and early summer nesting abundance of some songbirds.
- However, field borders are only part of “wildlife-friendly” farm management and are likely not sufficient by themselves to increase breeding populations of most farmland songbirds.
- Field borders are not a “one size fits all” solution. The benefits of field borders will vary from farm to farm and region to region,

depending on vegetative composition of the borders and surrounding landscape (fig. 6).

- Field borders that are part of a field border network, with nearby woodlots and a variety of crops, are likely to get more use by birds than field borders isolated in the middle of large fields (fig. 7).
- Landowners interested in increasing the number of breeding birds should consider maintaining a variety of fallow habitats, using conservation tillage in crop fields, and simultaneously managing timber stands to benefit wildlife.

Summary

Field borders increased populations of wintering sparrows and some breeding birds and provided early season nesting habitat. However, songbird nest success was low because of heavy nest depredation, which was not reduced by removing mammalian predators. Finally, field borders will likely get more use in landscapes that feature diverse mosaics of habitats. A diverse mosaic of habitats is produced on the landscape when wildlife benefiting conservation practices are employed as a system within a locale. Early successional habitat management in fallow fields, timber stand improvement thinning, prescribed burning, hedgerows, and continuous no-till farming are just a few leading examples of conservation practices beneficial to wildlife inhabiting fallow field borders.